No. 763,625. PATENTED JUNE 28, 1904.

E. A. OAKES, Jr.

FEEDING MECHANISM.

APPLICATION FILED MAY 11, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

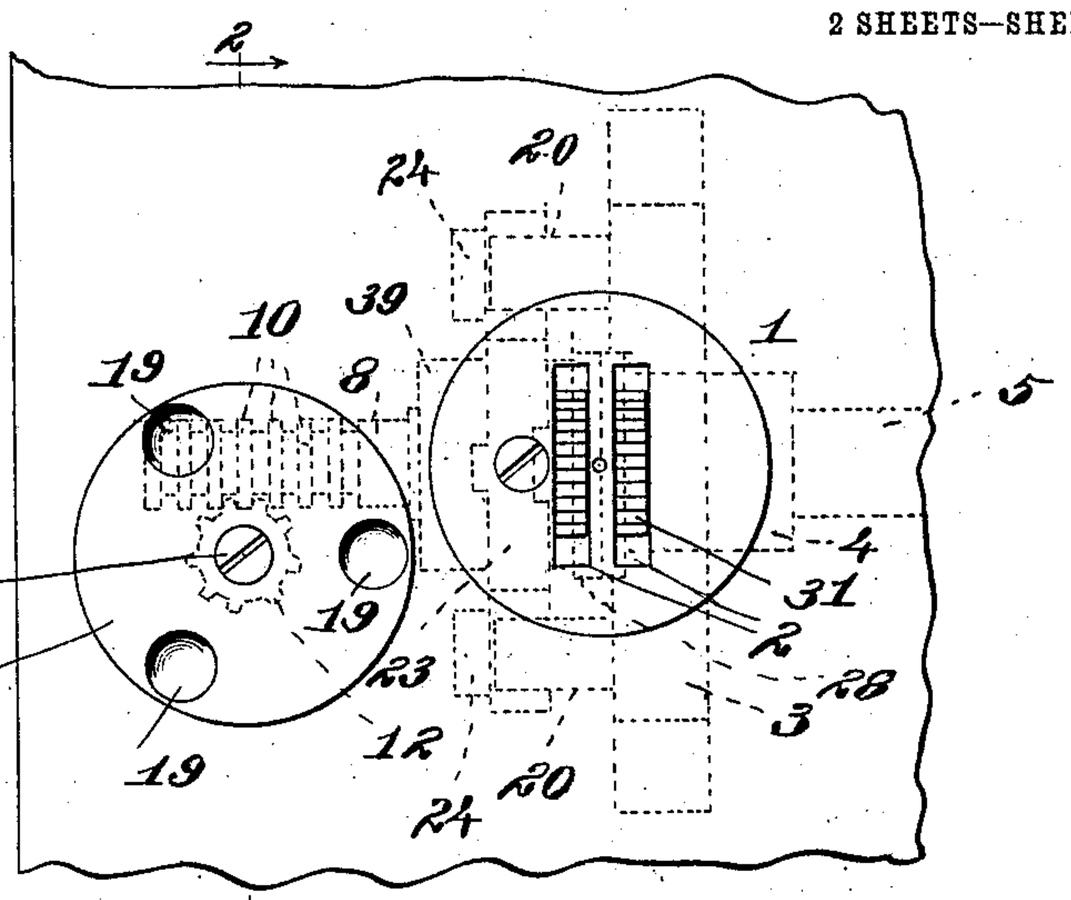


Fig. 2.

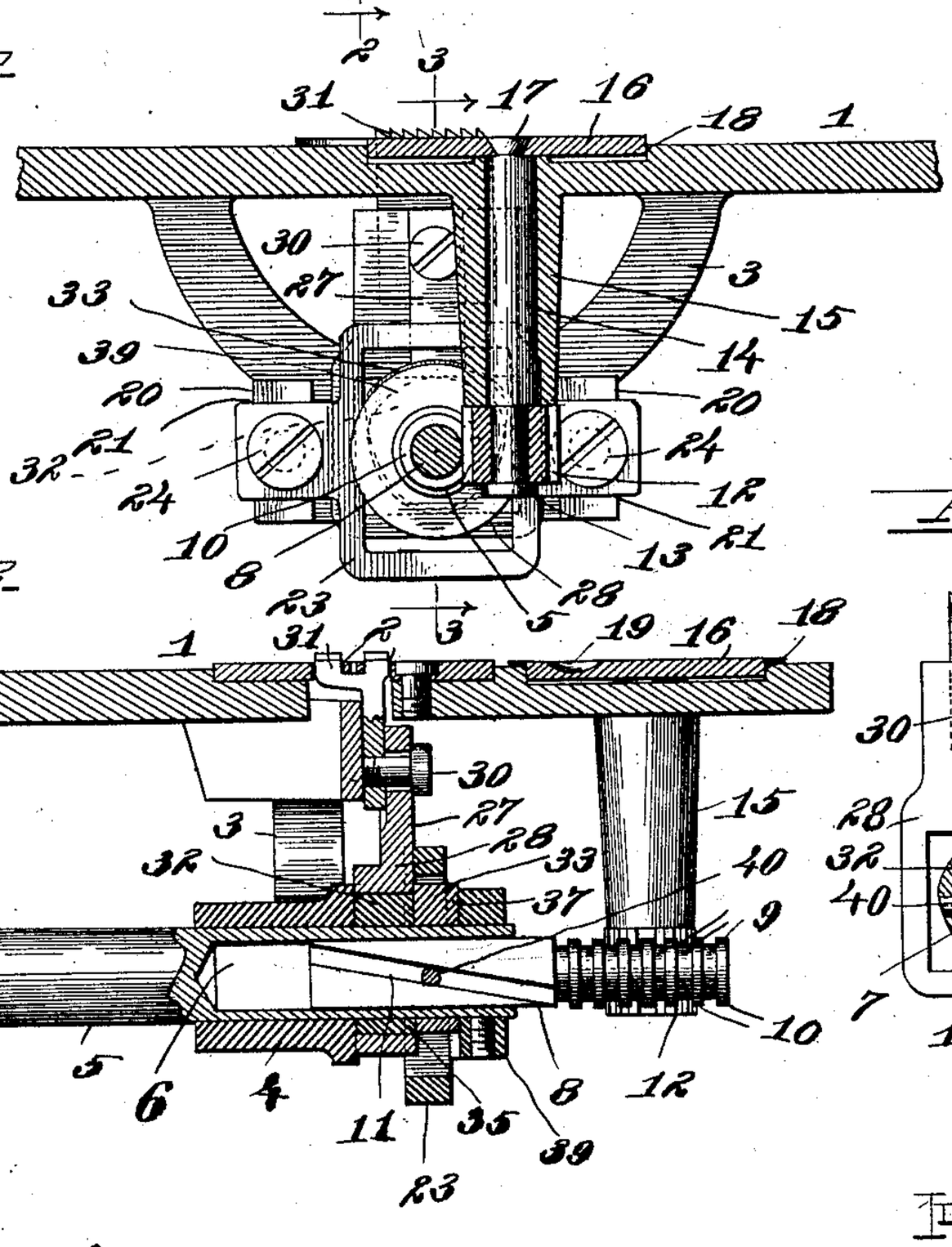
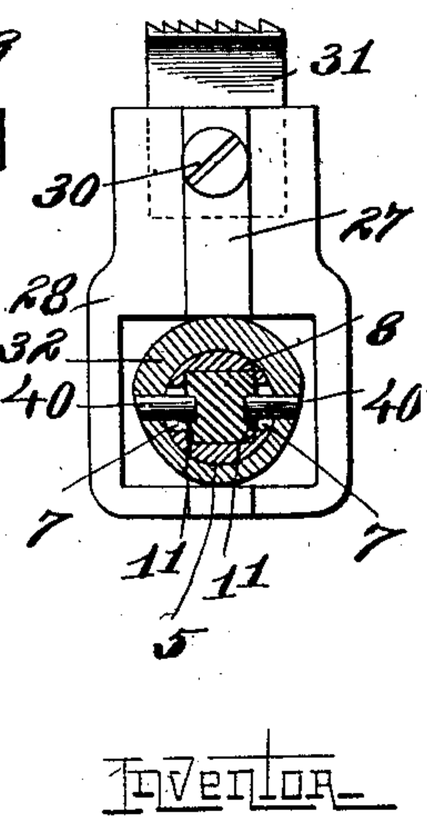


Fig. 3.

Fig. 4.



Witnesses.
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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5

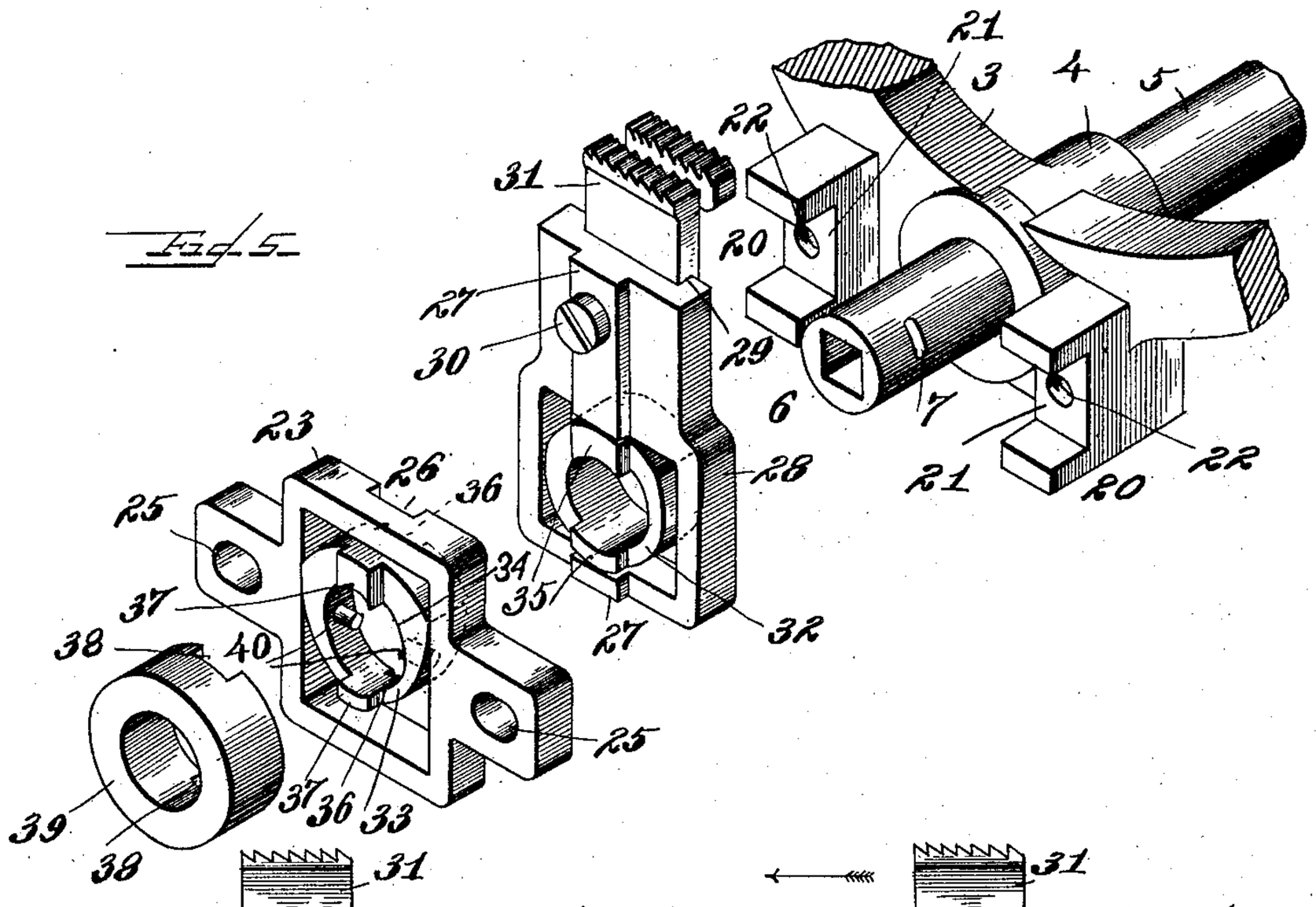


Fig. 7

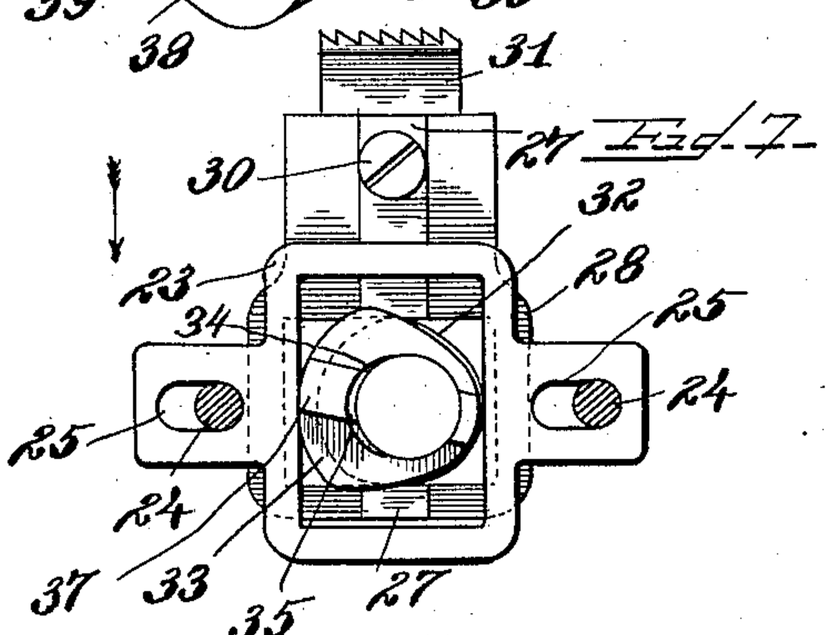


Fig. 6

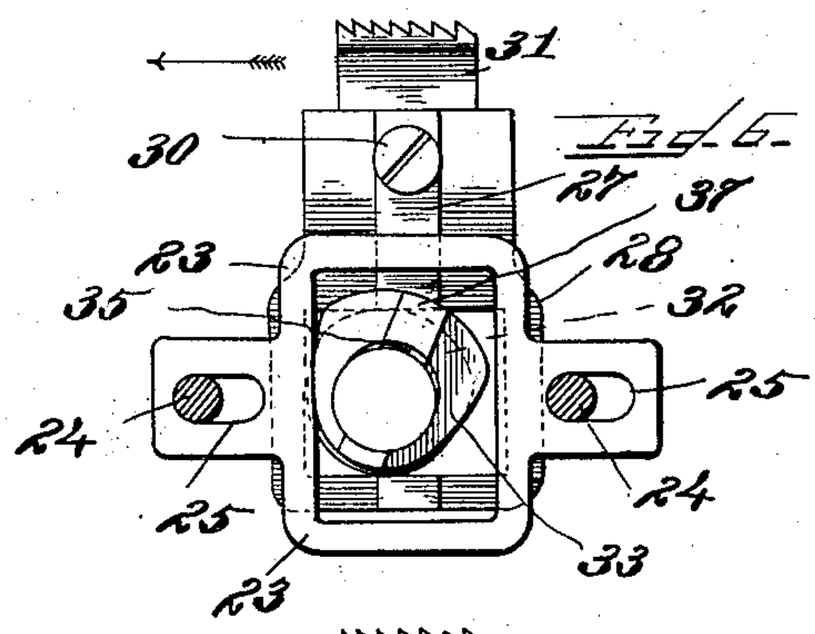


Fig. 8

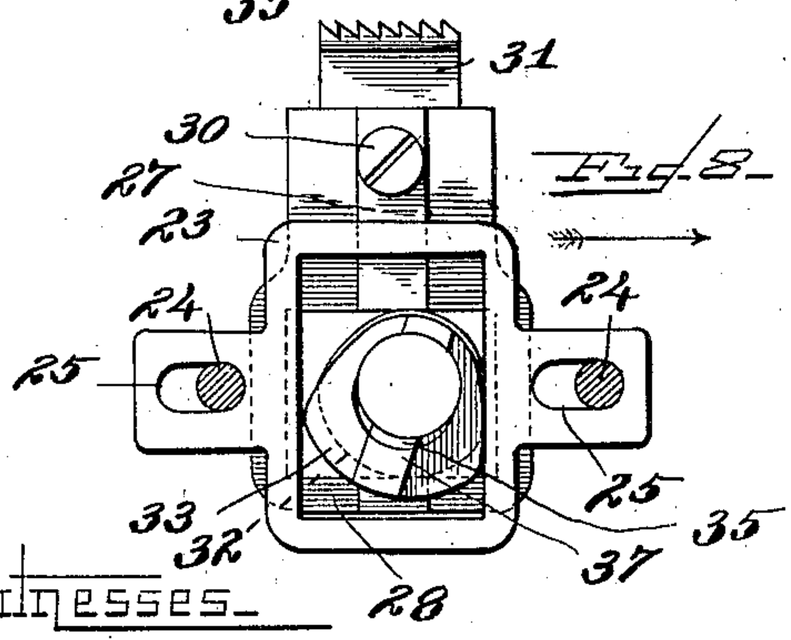
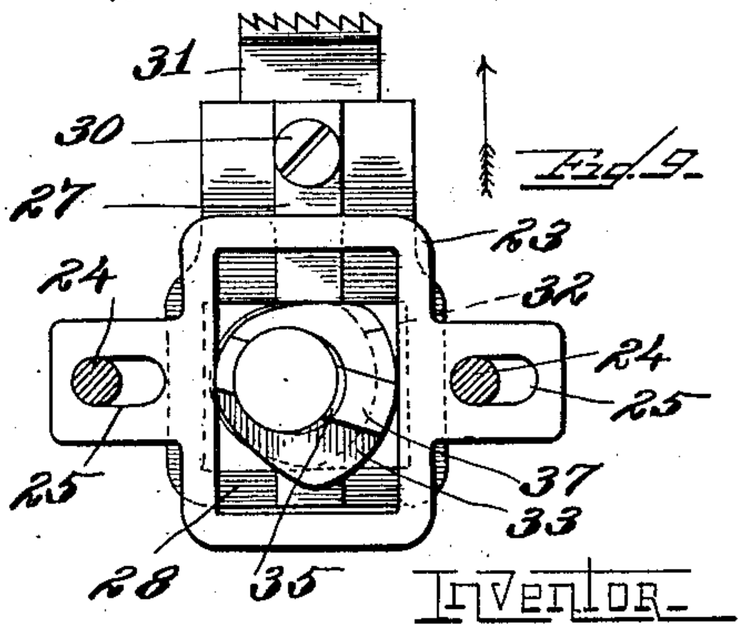


Fig. 9



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No. 763,625. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

ERNEST A. OAKES, JR., OF ROCKFORD, ILLINOIS.

FEEDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 763,625, dated June 28, 1904.

Application filed May 11, 1903. Serial No. 156,654. (No model.)

To all whom it may concern:

Be it known that I, ERNEST A. OAKES, Jr., a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Feeding Mechanisms, of which the following is a specification.

This invention relates to a feeding device which for the purpose of description I have applied to sewing-machines, and in this embodiment it refers particularly to an improved mechanism for advancing the fabric being operated upon by the needle.

One of the objects of this application of the invention is the provision of a positive feed for sewing-machines, wherein the feed-dog when in contact with the fabric moves always with and never contrary to the progressive movement of said fabric.

A further object is the provision of a feeding mechanism wherein the feed-dog describes in its cycle of movement an exact rectangle.

The invention further refers to a means for adjusting the extent of said feed movement and for making such adjustment during the operation of the machine and by means adjacent to the feeding mechanism.

The invention further refers to the various improvements in the construction herein shown and described.

In the accompanying drawings, Figure 1 is a detail top plan view showing a portion of the work-plate of a sewing-machine, the feed-operating mechanism being represented in dotted lines. Fig. 2 is a vertical sectional view through said feed mechanism, taken on dotted line 2 2 of Fig. 1. Fig. 3 is likewise a vertical section through said mechanism on dotted line 3 3 of Fig. 2. Fig. 4 is a detail view showing one of the yokes and the adjustable cam for horizontally reciprocating the feed-dog. Fig. 5 is a perspective view in detail of the parts of the mechanism of this invention. Figs. 6, 7, 8, and 9 illustrate the four principal positions assumed by the feed-dog and the respective corresponding positions of the cams.

In the embodiment herein shown of this invention, 1 refers to the work-plate of a sewing-machine, which work-plate is provided with the usual openings 2 to permit the movement of the feed-dog. Beneath the plate and formed integral therewith is a bracket 3, which bracket provides a bearing 4 for the forward end of the feed-shaft 5. This feed-shaft is bored out at its forward end, forming therein the opening 6, having in its opposite walls the elongated openings 7. An adjusting-shaft 8 lies within the opening 6 of the feed-shaft 5, being slidably mounted in said opening. The forward end of the adjusting-shaft 8 is provided with circular peripheral grooves 9, forming between them the annular rings or teeth 10. That portion of the adjusting-shaft 8 that lies within the opening 6 of the feed-shaft 5 is provided in each of its opposite sides with a groove 11, said grooves lying in a plane somewhat inclined with relation to the axial line of the shafts 5 and 8. The adjusting-shaft is moved forward and backward within the opening 6 in the end of the shaft 5 by means of a pinion 12, the teeth of which pinion mesh with the annular rings or teeth 10 on the said adjusting-shaft. The pinion 12 is fixed in any suitable manner—as, for instance, by means of the collar 13 on the lower end of the shaft 14, which shaft lies within the tubular boss 15, projecting downwardly from the under side of the work-plate 1. At its upper end the shaft 14 carries an adjusting-disk 16, fixed to said shaft, as by means of the screw 17, and lying in a circular depression 18 in the face of the work-plate 1. This disk is rotatable by means of several pockets 19, formed in its face for the reception of the thumb and fingers of the hand of the operator. Upon one of its sides the bracket 3 bears two integral lugs 20, each having in its face a longitudinal guide-groove 21, in the bottom of each of which guide-grooves is a screw-threaded opening 22, extending into each of said lugs.

A yoke 23 has two oppositely-extending guide-ears, which ears are adapted to lie within the guide-grooves 21 in the lugs 20, and is held in position with relation to said lugs by means of the screws 24, which screws pass through elongated openings 25 in said guide-ears and enter the screw-threaded open-

ings 22 in said lugs. The yoke 23 is provided in its rear face with a vertical guide-channel 26 for receiving the corresponding guide-rib 27 of the yoke 28. The yoke 28 in its rear face is also provided with a vertical channel 29, within which is secured, by means of a screw 30 passing through a suitable opening in said yoke, a feed-dog 31 of common construction. The feed-shaft 5 carries two heart-shaped cams 32 and 33, the former being fixed upon said shaft and being adapted to lie within the yoke 28 and the latter having an elongated central opening 34 and being adapted to lie within the yoke 23. On one of its faces the cam 32 has two diametrically opposite lugs 35, adapted to enter the corresponding grooves 36 in the adjacent face of the cam 33, and said cam 33 is provided with two corresponding lugs 37 on its opposite sides adapted to lie within the grooves 38 in the adjacent face of a collar 39, fixed upon the forward end of the feed-shaft 5. The cam 33 is provided with two diametrically opposite inwardly-projecting pins 40, which pins are adapted to extend through the elongated openings 7 in the feed-shaft 5 and enter the inclined grooves 11 in the adjusting-shaft 8.

From the foregoing it will be seen that the yoke 23 carries the yoke 28, and both yokes are susceptible of a horizontal reciprocating movement within the guide-grooves 21. It also will be observed that the yoke 28 is susceptible of a vertical reciprocation relative to the yoke 23. The cam 32, being fixed upon the feed-shaft 5, imparts a vertical reciprocation to the yoke 28, and the cam 33, being rotatively connected with the feed-shaft 5, imparts a lateral reciprocation to both the yokes 23 and 28, respectively. The cams 32 and 33 are relatively so mounted upon the feed-shaft 5 that the cam 32 will first raise the yoke 28 with reference to the yoke 23. The cam 33 will then move both yokes 23 and 28 laterally in one direction. The cam 32 will then move the yoke 28 downward, and the cam 33 then moves both yokes laterally to the place of beginning, completing the cycle of movement of the parts. The feed-dog 31 being secured to the yoke 28 has, of course, the same cycle of movement, said dog being adjusted in position relative to the work-plate so that upon the upward movement of the yoke 28 the serrated upper face of the dog is raised through the opening slightly above said work-plate. The second movement causes the dog to travel progressively and in a plane parallel with said plate a distance corresponding with the extent of the feed movement. The third movement of the cam causes the yoke 28, and consequently the feed-dog 31, to be depressed below the level of the upper face of the work-plate 1. The fourth movement of the cams returns the feed-dog to its primary position. To adjust the extent of the second or progressive movement of the feed-dog, the adjusting-disk 16 is rotated slightly, moving the adjusting-shaft 8 longitudinally with relation to the feed-shaft 5. This movement of the adjusting-shaft 8, by reason of the pin connection between the cam 33 and the inclined grooves 11 in said adjusting-shaft, causes said cam 33 to be moved upon the feed-shaft 5 in such manner as to give said cam a greater or less "throw," thereby directly affecting the extent of the progressive movement of said feed-dog 31.

In operation rotative movement is imparted to the feed-shaft 5 in any suitable manner. The adjusting-shaft 8 rotates with the feed-shaft, the annular rings or teeth 10 rotating between the teeth of the pinion 12. A rotative movement of the adjusting-disk 16 moves the adjusting-shaft 8 axially with reference to the feed-shaft 5. If said adjusting-shaft is moved toward the feed-shaft, the throw of the cam 33 will be increased, and consequently the extent of the horizontal reciprocation of the feed-dog 31 will likewise be increased. A movement of the adjusting-shaft 8 in the contrary direction—to wit, away from the feed-shaft 5—will diminish the throw of the cam 33, and thereby likewise diminish the forward-and-backward movement of the feed-dog.

While I have shown and described this feeding device in its application to sewing-machines, it is manifest that either in its present form or with certain modifications it might be applied to other and widely-differing mechanisms without departing from the spirit and scope of this invention. Such other type of mechanism to which my improved feeding mechanism may be applied may be punching-machines for perforating or punching holes in paper, leather, or sheet metal. Wherefore I desire to have it understood that I do not limit myself to the form or application herein shown, but desire to claim said invention broadly.

I claim as my invention—

1. In a feeding mechanism, in combination, a supporting-framework having a guideway therein; a yoke slidably supported in said guideway; a second yoke slidably supported beside the first-mentioned yoke and adapted to have a reciprocating movement with relation to said first-mentioned yoke in a direction at an angle with the line of movement of said first-mentioned yoke; a cam-shaft extending through said yokes; a cam on said shaft within each of said yokes for reciprocating the respective yokes; means for adjusting the degree of eccentricity of one of said cams; and a feed-dog carried by said second yoke.

2. In a feeding mechanism, in combination, a yoke adapted to have a reciprocatory movement; a second yoke having an engagement with the first-mentioned yoke and adapted to have a reciprocating movement with relation to said first-mentioned yoke in a direction at

an angle with the line of movement of said first-mentioned yoke; a cam-shaft; two cams on said shaft for reciprocating said yokes, one of said cams having a guideway therein and the other cam having a rib adapted to slide within said guideway; means for moving one of said cams with relation to the other cam; and a feed-dog carried by said second yoke.

3. In a feeding mechanism, in combination, a supporting-framework having a guideway therein; a yoke slidably supported in said guideway; a second yoke having an engagement with the first-mentioned yoke and adapted to have a reciprocating movement with relation to said first yoke in a direction at an angle with the line of movement of said first yoke; a cam-shaft; a cam on said shaft within each of said yokes for reciprocating the yokes, one of said cams having a guideway therein and the other cam having a rib adapted to slide within said guideway; means for moving one of said cams with relation to the other cam; and a feed-dog carried by said second yoke.

4. In a feeding mechanism, in combination, a reciprocatory yoke of substantially rectangular form having a guideway formed in its side; a second yoke, also of substantially rectangular form, having a rib upon its side adapted to slide within the guideway in said first yoke; a cam-shaft; a cam on said shaft within each of said yokes for reciprocating the yokes; one of the cams having a guideway in its side and the other cam having a rib fitting said guideway, one of said cams being loose relatively to the shaft; and a feed-dog carried by said second yoke.

5. In a feeding device, in combination, a feed-dog; a cam-shaft having an axial opening in one of its ends; an adjusting-shaft adapted to lie within said opening, said adjusting-shaft having two inclined grooves lying in the same plane in its opposite sides; a cam fixed on said cam-shaft; a cam mounted on said cam-shaft but movable with relation thereto, said last-mentioned cam having inwardly-extending pins for entering the inclined grooves in said adjusting-shaft, which cams are adapted to actuate the feed-dog; and means for moving said adjusting-shaft axially of said cam-shaft.

6. In a feeding device, in combination, a feed-dog; a cam-shaft having an axial opening in one of its ends; an adjusting-shaft adapted to lie within said opening and being provided with two inclined grooves lying in the same plane on opposite sides of said adjusting-shaft, said cam-shaft having two openings from the periphery of said cam-shaft to the inclined grooves in said adjusting-shaft, said adjusting-shaft also having a series of peripheral grooves; a cam fixed on said cam-shaft; a cam mounted on said cam-shaft but movable with relation thereto, said last-mentioned cam being provided with two inwardly-extending pins adapted to enter the inclined grooves in said adjusting-shaft, which cams are adapted to actuate the feed-dog; and a pinion meshing with the peripheral grooves in said adjusting-shaft for moving said shaft axially of said cam-shaft.

ERNEST A. OAKES, JR.

Witnesses:
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W. B. JOHANSON.